DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

| Facility Name: | Lockheed Martin Tactical Defense (formerly Unisys Corporation) | | | | |
|--------------------|---|--|--|--|--|
| Facility Address: | 3333 Pilot Know Road, Eagan, Minnesota 55121 MND000823914 | | | | |
| Facility EPA ID #: | | | | | |
| groundwater | If yes - check here and continue with #2 below. If no - re-evaluate existing data, or | | | | |
| | If data are not available skip to #6 and enter"IN" (more information needed) status code. | | | | |
| | | | | | |

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be "**contaminated**" above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

| | Yes | No | ? | Rationale / Key Contaminants |
|---|--|---|------------------------------------|---|
| Groundwater | | X | | Chromium |
| Air (indoors) ² | | X | | NA |
| Surface Soil (e.g., ft) | <2 | X | | Chromium |
| Surface Water | | X | | NA |
| Sediment | , , , , , , , , , , , , , , , , , , , | X | | NA |
| Subsurf. Soil (e.g ft) | .,>2 | X | | Chromium |
| Air (outdoors) | | X | | NA |
| prosuj exe If j eac exi un | oviding or citoporting docu ceeded. yes (for any rech "contamin planation for acceptable ris | ing appi imentati nedia) - ated" m the dete sk), and | ropriation der continuedium refere | #6, and enter "YE," status code after re "levels," and referencing sufficient monstrating that these "levels" are not use after identifying key contaminants in a, citing appropriate "levels" (or provide an tion that the medium could pose an incing supporting documentation. skip to #6 and enter "IN" status code. |

Rationale and Reference(s):

In 1988, chromium was detected in groundwater in the surficial saturated zone. Ten monitoring wells were placed and sampled on a quarterly basis until 1993. Total chromium concentrations ranged from <5ug/l - 92ug/l. Hexavalent chromium concentrations ranged from <5ug/l - 60ug/l. All groundwater concentrations of chromium were below the groundwater protection standard of 100 ug/l.

The potential sources of the chromium in the groundwater were the Sump Room and the Wastewater Treatment Room. Concentrations of total chromium found in soil at

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three intervals between zero and six feet below the floors in these areas ranges from 3 mg/kg to 7mg/kg. Concentrations of Hexavalent chromium in soil ranged from <0.021 mg/kg to 0.63mg/kg. Both the total and hexavalent chromium concentrations in the soil were below appropriate health risk levels. The current residential Soil Reference Value for hexavalent chromium is 71 mg/kg. Based on the investigation results, the corrective action process was terminated on December 2, 1993.

Footnotes:

¹ "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

² Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

Potential Human Receptors (Under Current Conditions)

| Contaminated Media | Residents | Workers | Day Care | Construction | Trespassers | Recreation | Food ³ |
|-------------------------------|-----------|---------|----------|--|--|------------|-------------------|
| Groundwater | NO | NO | NO | NO | NO | NO | NO |
| Air (indoors) | | | | DESCRIPTION OF THE PROPERTY OF | | | |
| Soil (surface, e.g., <2 ft) | NO | NO | NO | NO | NO | NO | NO |
| Surface Water | | | , | 1 10 12 40 140 100 | W | | |
| Sediment | | | | 4 | Maria Ma | | |
| Soil (subsurface e.g., >2 ft) | NO | NO | NO | NO | NO | NO | NO |
| Air (outdoors) | | | | | | | |

Instructions for Summary Exposure Pathway Evaluation Table:

- 1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated") as identified in #2 above.
- 2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("____"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

| X | If no (pathways are not complete for any contaminated media-receptor combination) - |
|---|--|
| | skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional <u>Pathway Evaluation Work Sheet</u> to |
| | analyze major pathways). |
| | If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation. |
| | If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 |
| | and enter "IN" status code |

Chromium concentrations in the soil and groundwater were below health based standards.

References:

Rationale and Reference(s):

- 1. Unysis, 1993, September 3, Quarterly Groundwater Monitoring Results Summary
- 2. Unysis, 1993, October 1, Soil Investigation Final Report

³ Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

| "significant" (greater in magni "levels" (used to though low) and | res from any of the complete pathways identified in #3 be reasonably expected to be i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) itude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable or identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even a contaminant concentrations (which may be substantially above the acceptable "levels") greater than acceptable risks)? |
|---|---|
| _ | If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant." |
| | If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant." |
| 30000000000000000000000000000000000000 | If unknown (for any complete pathway) - skip to #6 and enter "IN" status code |
| Rationale and R | Reference(s) |
| | · · · · · · · · · · · · · · · · · · · |

⁴ If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

| | If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing <u>and</u> referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment). |
|---------|---|
| | she-specific Human Heath Risk Assessment). |
| | If no (there are current exposures that can be reasonably expected to be "unacceptable' continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure. |
| | If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code |
| Rationa | le and Reference(s) |

| 6. | Control EI ex | opropriate RCRIS status codes for the Current Human Exposures Under went code (CA725), and obtain Supervisor (or appropriate Manager) date on the EI determination below (and attach appropriate supporting on as well as a map of the facility): |
|----|---------------|--|
| | <u>X</u> | YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the Lockheed Martin Tactical Defense facility, EPA ID # MND000823914, located at Eagan Minnesota under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility. |
| | -11-12-170 | NO - "Current Human Exposures" are NOT "Under Control." |
| | | IN - More information is needed to make a determination. |
| | Completed by: | (signature) Date 5/29/67 (print) Crague C. Biglow |
| | | (title) Hydrogeologist |
| | Supervisor: | (signature) Date $5/29/02$ |
| | | (print) Bruce Brott |
| | | (title) Unit Supervisor |
| | | (EPA Region or State) |
| | Locations w | here References may be found: |
| | Minnesota | Pollution Control Agency RCRA files. |
| | Contact tele | phone and e-mail numbers |
| | (nam | e) Crague Biglow |
| | ` | no #) 651/207 8477 |

(e-mail) crague.biglow@pca.state.mn.us

FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

| Facility Name: | Lockheed Martin Tactical Defense (formerly Unisys Corporation) | | | | |
|--------------------------|---|--|--|--|--|
| Facility Address: | 3333 Pilot Know Road, Eagan, Minnesota 55121 | | | | |
| Facility EPA ID #: | MND000823914 | | | | |
| releases to Waste Mar | the groundwater media, subject to RCRA Corrective Action (e.g., from Solid nagement Units (SWMU), Regulated Units (RU), and Areas of Concern sen considered in this EI determination? If yes - check here and continue with #2 below. If no - re-evaluate existing data, or if data are not available, skip to #8 and enter"IN" (more information needed) status code. | | | | |
| | | | | | |

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

| | roundwater known or reasonably suspected to be "contaminated" above appropriately protective vels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, Hance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility? | | | |
|-----|--|---|--|--|
| | | If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation. | | |
| | X | If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated." | | |
| | | If unknown - skip to #8 and enter "IN" status code. | | |
| | | | | |
| Fro | om 198 comium | Reference(s): 8 to 1993, ten monitoring wells were sampled on a quarterly basis. Total concentrations in groundwater ranged from <5 ug/l to 92 ug/l. Hexavalent concentrations in groundwater ranged from <5 ug/l to 60 ug/l. All concentrations were below the MCL for hexavalent chromium of 100 ug/l. | | |

Footnotes:

¹"Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

| If yes - continue, after presenting or referencing the physical evidence (e.g., groundwa sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination". |
|--|
| If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination" ²) - sk to #8 and enter "NO" status code, after providing an explanation. |
| If unknown - skip to #8 and enter "IN" status code. |

² "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

| If yes - continue after identifying potentially affected surface water bodies. |
|--|
| If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater |
| "contamination" does not enter surface water bodies. |
| If unknown - skip to #8 and enter "IN" status code. |
| onale and Reference(s): |

| 5. | maximum concer appropriate groun discharging conta | of "contaminated" groundwater into surface water likely to be "insignificant" (i.e., the attration ³ of each contaminant discharging into surface water is less than 10 times their adwater "level," and there are no other conditions (e.g., the nature, and number, of aminants, or environmental setting), which significantly increase the potential for eacts to surface water, sediments, or eco-systems at these concentrations)? |
|----|--|---|
| | *************************************** | If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration ³ of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system. |
| | | If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration ³ of <u>each</u> contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing. |
| | | If unknown - enter "IN" status code in #8. |
| | Rationale and Re | eference(s): |
| | | |

³ As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

Can the discharge of "contaminated" groundwater into surface water be shown to be "currently

6.

| to continue | until a final remedy decision can be made and implemented ⁴)? |
|-----------------|---|
| | If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment, appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full |
| | If no - (the discharge of "contaminated" groundwater can not be shown to be "currently acceptable") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems. |
| | If unknown - skip to 8 and enter "IN" status code. |
| Rationale and R | Reference(s): |
| r | |

⁴ Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

⁵ The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

| ertical, as necessary) dimensions of the "existing area of contaminated groundwater?" If yes - continue after providing or citing documentation for planned activities or future |
|---|
| sampling/measurement events. Specifically identify the well/measurement locations which will tested in the future to verify the expectation (identified in #3) that groundwater contamination we not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination." |
| If no - enter "NO" status code in #8. |
| If unknown - enter "IN" status code in #8. |

- Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).
 - YE Yes, "Migration of Contaminated Groundwater Under Control" has been verified.

Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the Lockheed Martin Tactical Defense facility, EPA ID # MND000823914, located at Eagan Minnesota. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring was conducted between 1988 and 1993 to confirm that contaminated groundwater would remain within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

NO - Unacceptable migration of contaminated groundwater is observed or expected.

IN - More information is needed to make a determination.

| Completed | |
|-----------|--|
| by: | |

Crague C. Biglow

(title)

(print)

Hydrogeologist

Supervisor:

(signature)

Date

Bruce Brott

(title)

(print)

Unit Supervisor

Minnesota Pollution Control Agency

Locations where References may be found:

Minnesota Pollution Control Agency RCRA files.

Contact telephone and e-mail numbers

| (name) | Crague Biglow |
|-----------|-------------------------------|
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